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## Urgent Notice to Authors and Subscribers

The National Oceanic and Atmospheric Administration announces that the *Monthly Weather Review* will become a publication of the American Meteorological Society beginning with Volume 102, No. 1, January 1974. During 101 years of publication by NOAA and its predecessors, the *Monthly Weather Review* has served as a medium for meteorological information originating both within and outside the Federal Government; in recent years, as a research journal, its contributors have been a representative cross section of the entire meteorological community, both national and international; now more than half of the authors have non-NOAA affiliations. Under these circumstances, NOAA has concluded that the public interest would be better served by a *Monthly Weather Review* under non-Government sponsorship.

The American Meteorological Society, as a major scientific society and publisher of several important journals serving atmospheric and hydrospheric scientists throughout the world, is uniquely qualified to continue publication of the *Monthly Weather Review*. Under the editorship of Chester W. Newton, the *Monthly Weather Review* will continue its basic emphases on the meteorological topics of weather observation, analysis and forecasting, and instrumentation. For further information the reader is referred to the August 1973 issue of the *Bulletin of the American Meteorological Society*.

### INFORMATION FOR AUTHORS

The American Meteorological Society announces that henceforth manuscripts (Articles and Notes or

Correspondence) for the *Monthly Weather Review* should be submitted to Dr. Chester W. Newton, Editor, Monthly Weather Review, National Center for Atmospheric Research, P.O. Box 1470, Boulder, Colo. 80302 (phone: 303-494-5151). Authors may be members or nonmembers of the Society, and of any nationality, but only manuscripts in the English language can be accepted. Reference should be made to current issues of the *Journal of the Atmospheric Sciences*, *Journal of Applied Meteorology*, or *Journal of Physical Oceanography* for guidance in the preparation of papers. Authors' institutions will be requested to pay a publication page charge in conformance with the current rate for all Society journals.

### INFORMATION FOR SUBSCRIBERS

The December 1973 *Monthly Weather Review* will be the last issue available from the Superintendent of Documents; he will make an adjustment on any present subscription that extends beyond that issue.

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# PICTURE OF THE MONTH

## Dry Air Intrusion Into a Low-Level Moist Tongue as Viewed by ATS 3

**JOSEPH A. MILLER**—*Satellite Field Services Station,  
National Environmental Satellite Service, NOAA, Kansas City, Mo.*

Satellite imagery received from ATS 3, on Jan. 18, 1973, gave a vivid picture of a dry air intrusion into a low-level moist tongue and was instrumental in the refinement or “fine tuning” of subsequent tornado watches issued by the National Severe Storms Forecast Center (NSSFC) at Kansas City, Mo., during the day.

One of the prime mechanisms responsible for the release of convective instability is the intrusion of dry air at low or middle levels in the troposphere into or over the low-level moist tongue. Miller (1972) states: “In situations preceding significant tornado development, a distinct dry tongue is present in the low or middle levels, and, provided other criteria are satisfied, the primary development will occur where the dry air intrudes into or over the lower moist tongue.” He further states, “Dry air intrusions not only help in delineating future tornado areas, but apparently provide a major contribution to the trigger mechanism in the majority of tornado situations.” Interaction

between the moist and dry tongues is but one of the parameters responsible for the production of severe thunderstorms. Evaporative cooling in this mixture zone is thought to be responsible for the destruction of the inversion layer, or so-called “cap,” thus allowing convective action to rapidly penetrate into the middle and upper troposphere.

Midwinter tornadic outbreaks are not infrequent. Upper air data at 1200 GMT on Jan. 18, 1973, as analyzed by the Severe Local Storms (SELS) unit of the NSSFC, indicated that sufficient parameters were indeed present for possible severe thunderstorm activity later in the day. An early morning surface analysis showed a low-pressure center in south-central Kansas which, as the day progressed, became better organized, deepened, and moved north-northeastward toward the upper Mississippi Valley.

At 850 mb, a tongue of dry air was upstream in close proximity to a moist tongue (fig. 1). The dew-point differ-

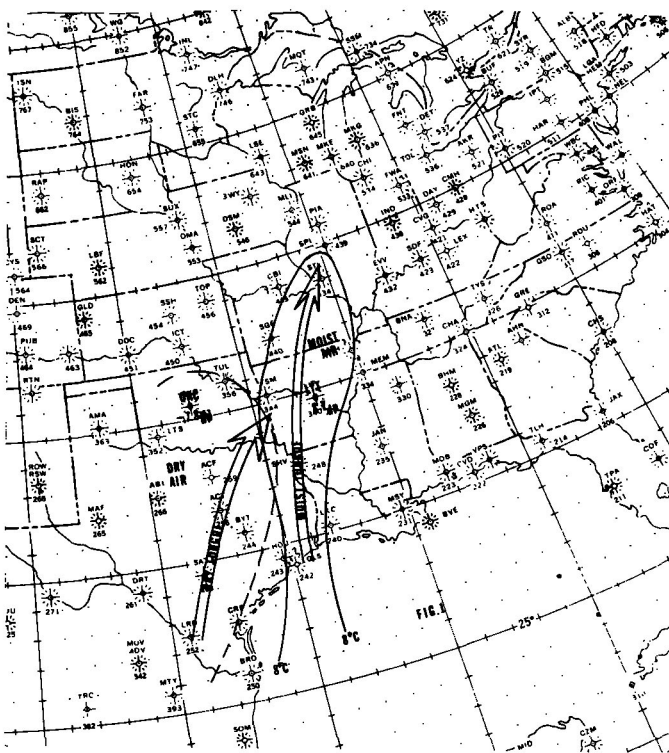


FIGURE 1.—The 1200 GMT, Jan. 18, 1973, 850-mb analysis of dry and moist tongues.

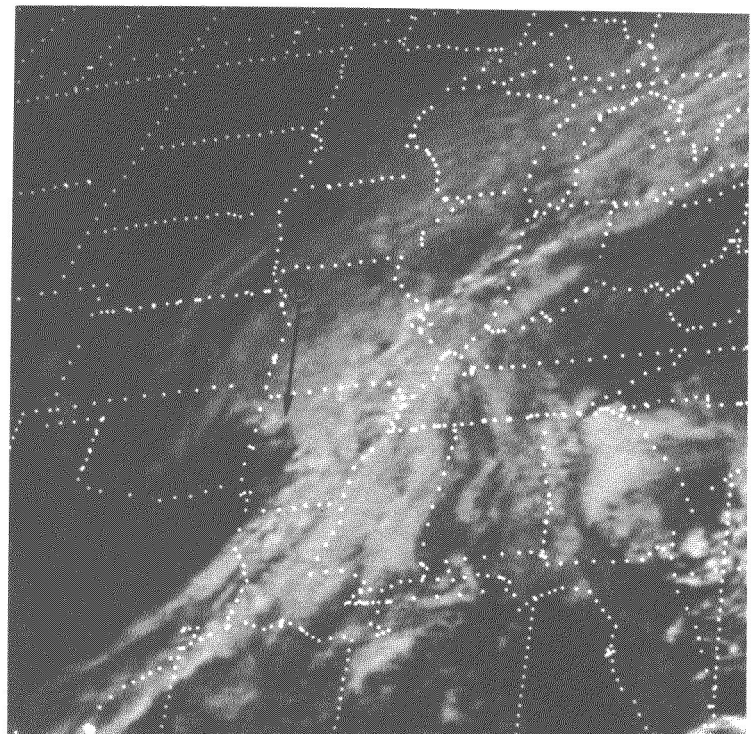


FIGURE 2.—ATS 3 photograph showing the dry slot (clear area, D) over western Arkansas at 1527 GMT, Jan. 18, 1973.

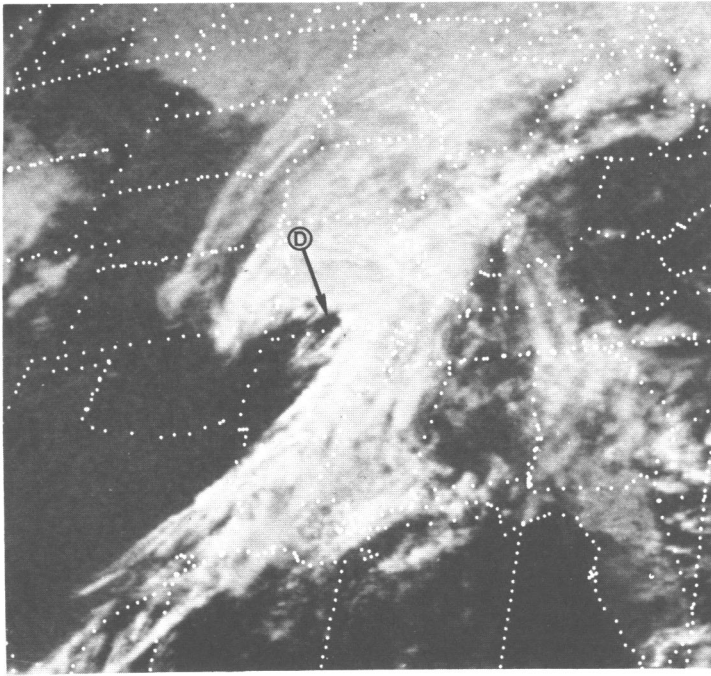


FIGURE 3.—ATS 3 photograph showing the dry slot (D) over southwest Missouri at 1742 GMT, Jan. 18, 1973.

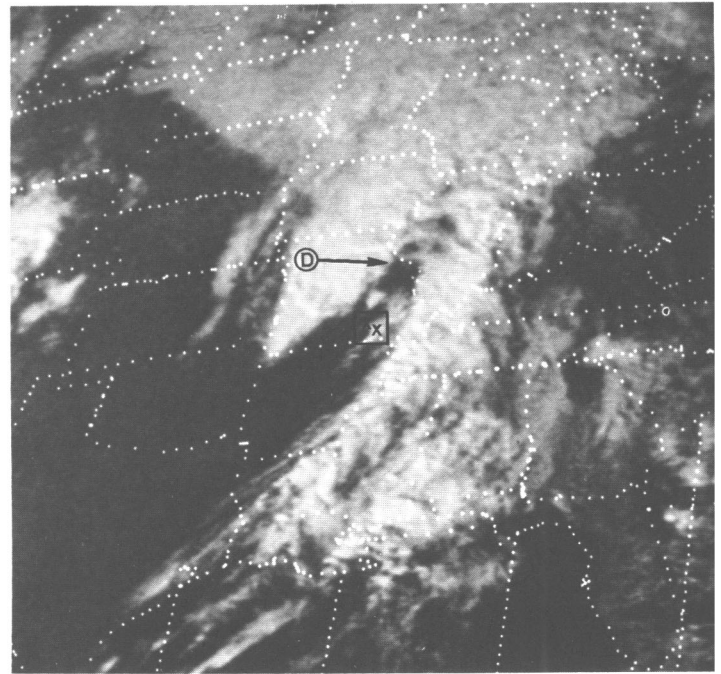


FIGURE 4.—ATS 3 photograph showing the dry slot (D) over western Illinois at 2051 GMT, Jan. 18, 1973. The Xs indicate tornadoes observed in southeastern Missouri.

ential between Oklahoma City, Okla., and Little Rock, Ark., was more than  $16^{\circ}\text{C}$ . The first photograph of the day received by the Satellite Field Services Station (SFSS) at Kansas City (fig. 2) at 1527 GMT also indicated dry air (clear area) over northeast Texas and southeast Oklahoma. (Note the same general configuration of the 850-mb dry tongue in fig. 1 and the clear area in the ATS 3 photograph in fig. 2.) Figure 3 vividly pictures the intruding dry air (D), which by this time (1742 GMT) had penetrated the western half of Arkansas and southwest Missouri. In the final photograph of the day (fig. 4), acquired at 2051 GMT, the dry air (D) had pushed into west-central Illinois, indicating the advection of dry air into the deepening cyclonic circulation.

Preliminary reports listed 14 tornadoes in southeastern Missouri, southern Illinois, and southern Indiana. The most numerous tornadic activity occurred between 2130 GMT on January 18 and 0100 GMT on January 19, which was after the last ATS 3 picture of the day was received and processed by the Kansas City SFSS. However, two tornadoes were reported in southeastern Missouri (indi-

cated by Xs in fig. 4) during the 30-min period prior to the time the picture was acquired.

In this case, satellite imagery was an aid to the National Severe Local Storms forecaster by identifying the dry air intrusion and determining its motion. No deaths were reported in the area struck by tornadoes. This, no doubt, was due in part to the timeliness of the watches issued by the NSSFC. Colocation of the SFSS and the NSSFC presents a unique opportunity to correlate satellite imagery and conventional meteorological data. Relationships pertinent to mesoscale features and satellite imagery can be evaluated in real time. With the launch of the Geostationary Operational Environmental Satellite (GOES) early in 1974, improved resolution and infrared capabilities should further enhance and improve our understanding of these relationships.

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